SHRI MATA VAISHNO DEVI UNIVERSITY, KATRA

School of Mechanical Engineering

B. Tech. (Branch) Minor / Major Examination (Even/Summer) 2018-19

Entry No: 17BME020

Date: 4th Feb.2019

Course Title: Machine Design

Total Number of Pages: [02]

Total Number of Questions: [04]

Course Code: MEL2017

Time Allowed: 1.5 Hours

Max Marks: [20]

Instructions / NOTE

i. Attempt All Questions.
ii. Support your answer with neat freehand sketches/diagrams, wherever appropriate.
iii. Assume an appropriate data / information, wherever necessary / missing.

	Section - A		
Q1.	a) What are the causes of stress concentration?	[01]	CO1
	b) What is a repeated and reversed stress? Draw stress-time curve for repeated and reversed stress.	[01]	CO1
	c) What is the difference between failure due to static load and fatigue failure?	[01]	CO1
	d) What are the factors that affect endurance limit of machine part?	[01]	CO1
	e) Explain modified Goodman diagram for bending stresses?	[01]	CO1
	Section - B		
Q2.	A plate made of steel 45C8 (Sut = 630 N/mm2) in machined and cold drawn condition is shown in Figure1. It is subjected to a completely reversed axial load of 30 kN. The notch sensitivity factor q can be taken as 0.7 and the expected reliability is 90%. The factor of safety is 2.5. The size factor can be taken as 0.85. Determine the plate thickness for infinite life.	[05]	CO2
Q3.	The section of a steel shaft is shown in figure 2. The shaft is machined by turning process. The section at XX is subjected to a constant bending moment of 500 kN-m. The shaft material has ultimate tensile strength of 500 MN/m2, yield point of 350 MN/mm2 and endurance limit in bending for 7.5 mm diameter specimen of 210 MN/m2. The notch sensitivity factor can be taken as 0.8. The theoretical stress concentration factor may be interpolated from following tabulated values: (rf/d) 0.025 0.05 0.1 K_t 2.6 2.05 1.66 Where rf is fillet radius and d is shaft diameter. The reliability is 90%. Determine the life of the shaft.	[05]	CO2
Q4.	A rotating bar made of steel 45C8 (Sut = 630 N/mm2) is subjected to a completely reversed bending stress. The corrected endurance limit of the bar is 315 N/mm2. Calculate the fatigue strength of the bar for a life of 90,000 cycles.	[05]	CO2

Course Outcomes

CO	Questions Mapping	Total Marks	Total Number of Students (to be appeared in Exam)
CO1	1(a),(b),(c),(d),(e)	05	35
CO2	2,3,4	15	